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THE ORGAN OF THE
NEW YORK ENTOMOLOGICAL CLUB.

Devoted Exclusively to Lepidoptera.

VOLUME II.

EDITED BY
HENRY EDWARDS.

NEW YORK:
1882.

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ERRATA.

Page 3, line 22, for "indviduals" read "individuals."
" 4, " 23, add "t" to the first word of the line.
" 6, " 31, for "courses" read "causes."
" 30, " 31, read "Grapta Silenus."
" 30, " 42, read "Argynnis."
" 30, " 43, read "Argynnis."
" 33, " 8, second column, for "Sambuscus" read "Sambucus."
" 35, " 17, for "Mentries" read "Menetries."
" 44, " 7, for "Danopolis" read "Demopolis."
" 44, " 29 and 31, for "synonym" read "synonomy."
" 54, " 37, read "as wide at base as the thorax."
" 66, " 57, first column, read "rare, one ♀."
" 71, " 1, first column, read "Heterophleps."
" 71, " 14, first column, read "Deilinea."
" 93, " 47, read "was detected" for "were detected."
" 94, " 9, read "After the imagines emerge."
" 97, " 2, for "patustris" read "palustris."
" 97, " 43, for "seem" read "seems."
" 98, " 22, after "internal margin" add a comma.
" 98, " 29, for "Querci" read "Quercus."
" 99, " 30, for "oblinata" read "oblinita."
" 101, " 13, for "Cerussaria" read "obrussaria."
" 139, " 17, for "1 ♀" read "1 ♂."
" 161, " lines in foot note, the "o" displaced—last line read "Turnus."
" 164, " 38, for "Orgyvia" read "Orgyia."
" 186, " 23, for "semi-flarea" read "semi-flava."
" 188, " 12, for "photoliphography" read "photolitography."

PAPILIO.

DEVOTED TO LEPIDOPTERA EXCLUSIVELY.

VOL. II. No. 6. JUNE, 1882.

ORGAN OF THE

NEW YORK ENTOMOLOGICAL CLUB.

Subscription Two Dollars per Annum (Ten Numbers). Single Numbers Twenty Cents.

COMMUNICATIONS AND REMITTANCES SHOULD BE ADDRESSED TO

Mr. HENRY EDWARDS, No. 185 East 116th St., New York City.

NEW YORK:
1882.

"PAPILIO."

A monthly journal, devoted to Lepidoptera exclusively; the organ of the New York Entomological Club. Price, $2.00 per annum.

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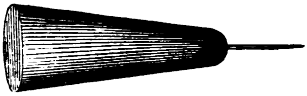

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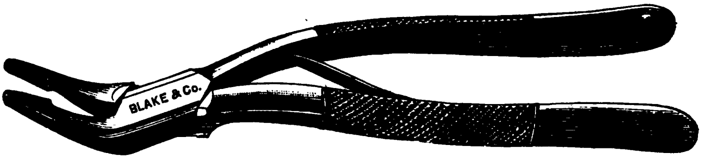

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PAPILIO.

Organ of the New York Entomological Club.

Vol. II.] Nov.-Dec., 1882. [Nos. 9 and 10.

DOUBLE NUMBER.

Note.—It was impossible to issue the November number in proper time, so that the articles which would have composed it are given with the December number, making the same amount of pages.

ON PAPILIO MACHAON L., AND ITS N. AMERICAN REPRESENTATIVES—; PAPILIO RUTULUS. BVD.—; AND PARNASSIUS. BEING PORTION OF A PRELIMINARY REPORT ON THE BUTTERFLIES OF WASHINGTON TERRITORY.

By Dr. H. A. Hagen.

As far as I know all insects, hitherto described, from Washington Territory were collected west of the Cascade Mountains. The larger portion of this Territory east of the Cascade Mountains, north of the Columbia River, to the frontier of Idaho, has never been visited by entomologists, except perhaps the southeastern belt of the Wallula Valley. The climate of the country east of the Cascade Mountains is very different from that west of them, the latter being similar to the climate of California. The country east of the Cascade Mountains consists to a large extent of the basin of the Columbia River, with immense sage-brush deserts, and here falls the least amount of rain through the U. Sts. At right and left mountains, with a rich vegetation of forests and large fertile valleys, ascend to the Cascades, and the Rocky Mountains. It is one of the few parts in the U. Sts. not yet examined by entomologists, and the good chance to collect here was offered by the N. Transcontinental Survey, under the direction of Prof. R. Pumpelly. The collection of butterflies made by *Mr. S. Henshaw* and *Mr. R. H. Stretch* is large, and contains interesting species, which may justify a preliminary report.

The preparation and spreading of the butterflies has only been commenced, so that but imperfect notes can be given, but as the collection of the Cambridge Museum, contains a large number of species, determined by the best authorities, the notes based upon a careful comparison of the Washington Territory species with those in the collection may be acceptable.

The specimens were collected from June 24 to July 27, from Umatilla to Spokane Falls. Some were taken near The Dalles, and at Umatilla, on the Oregon side of the Columbia River, where Mr. Morrison collected for a few days. After July 27 some were collected in Western Montana. In Washington Territory we crossed the desert opposite Umatilla, and followed the Yakima River and the valleys on the right side to the fork in the Cascade Mountains, returning *via* Ellensburgh, and through the desert to Ainsworth and Spokane.

PAPILIONIDÆ.

P. ZOLICAON AND P. OREGONIUS.

The large number of specimens of both sexes (74) approves the statement that both species *cannot be separated.* Half of them were collected June 24, 25, at Umatilla, on the Oregon side of the Columbia River; the other half in Washington Territory, just opposite Umatilla, June 26. One old and torn specimen July 18, at Lone Tree Camp, near the Yakima River. Some collected at Spokane are in the collection of Mr. Ricksecker. The main part of the specimens belongs to *Pap. oregonius.* The typical *P. Zolicaon* is only represented by half a dozen specimens flying promiscuously with the others.

The true *P. Zolicaon* is to be recognized—I—by the black spot in the anal rufous spot *entirely* isolated above and below; II—by the cell of the primaries on the under side wholly black; III—by the abdomen being black, with only a yellow side stripe; IV—by smaller size (of W. H. Edwards). Concerning the black isolated spot (I.) I find among the Californian specimens in the collection one female with a continuation of the spot on the under side to the black stripe which edges the inner margin. Mr. W. H. Edwards has figured pl. 6 f. 4 *exactly* the same for the female of *P. Zolicaon,* without mentioning it in the description. The specimens from Washington Territory have the spot either isolated or connected below. Some specimens of the true *P. oregonius* possess isolated black spots, sometimes only in one wing. There are before me *all intermediate* forms of a spot entirely isolated, or partly or wholly connected with the black stripe of the edge. Concerning the cell of the primaries (II.) some *P. oregonius* with a connected spot and a yellow abdomen have the cell partly or even *entirely* black as *P. Zolicaon;* on the contrary, some *P. Zolicaon* (with a largely black abdomen) have the cell yellow as *P. oregonius.* The color of the abdomen (III.) is, indeed, largely black in *P. Zolicaon;* but sometimes true *P. oregonius* (with the spot connected with the inner margin, and a yellowish cell of the primaries) have the abdomen as largely black.

The size is very variable. *P. oregonius* male expands from 80 to 98 mm. (3¼–3¾ inch); the female from 100 to 110 mm. (4–4½ inch). *P. Zolicaon*, male, from 78 to 86 mm.; female 92 to 94 mm. (100 mm., W. H. Edwards). The tail of the wings varies in length from 5 to 9 mm.; in breadth from 1 to 2½ and sometimes to 3 mm.; its form is very variable, strongly spathulated or rounded or pointed at the tip.

In Yakima Valley, July 5th, Mr. Henshaw found a full grown caterpillar feeding on wild parsnip, Mr. Stretch one on sage. The first one escaped by accident, but Mr. Stretch managed by ingenious contrivances to educate the imago, which proved to be *P. oregonius*. The caterpillar is very similar to that of *P. machaon* in form, color and pattern. As I am very well acquainted with the latter, I remarked directly a difference. The first transversal black band behind the head has a large gap in the middle, perhaps as large as the remaining part of the band, on each side. *P. machaon* has never this band interrupted, at least not in the specimens before me; nor find I mentioned such an interruption in any description or figure of the caterpillar; also not in Mr. Stretch's figure and description of *P. Zolicaon*, published by Mr. W. H. Edwards, and not in his description of *P. oregonius*, "PAPILIO," II., p. 120, The chrysalis agrees with that of *P. Zolicaon*. Mr. Stretch has made a colored sketch of the caterpillar. The chrysalis skin is before me.

After all, there is no doubt that *P. oregonius* is merely a variety of *P. Zolicaon*, mostly larger in size, more yellow, the black spot connected with the black interior anal band, which is somewhat dilated on tip, the black bands of the abdomen narrower.

P. oregonius (not *oregonia*, as Mr. Edwards writes), was very common on both sides of the Columbia River at Umatilla, June 24th to 26th; at The Dalles, June 23d, it was not observed, though eagerly looked for. It was not seen June 30th at Lone Tree on the Yakima River, but on returning to the same place July 18th, one old specimen was collected; probably *P. oregonius* had there appeared and disappeared in the time between those days.

At the mouth of the Natches river, at a higher elevation, July 4, the full-grown larva was still found, therefore the imago would not appear there before the end of July. The specimen raised by Mr. Stretch appeared July 25.

When *P. oregonius* was observed at Umatilla we all believed it to be *P. machaon*, the more so as Mr. W. H. Edwards had just published ("PAPILIO," p. 74) the capture of a specimen by Mr. H. Edwards at The Dalles, where we had looked for this species without success. A careful comparison of Mr. W. H. Edwards' paper with the materials at hand has given the following result.

The material consists for the European species, twelve specimens (Germany, Austria, Switzerland, Alsace) especially selected for the collection out of a very large number and representing all varieties in size, color and pattern, which I was able to observe; and one *P. hospiton.* The material for the Asiatic species (from East India, Amballa, Koolloo, Himalaya, about 6000′ high, Jalloree-pass, Himalaya, more than 10,000′ high) thirty specimens especially selected out of about 500 specimens as representing all varieties. I possess only one male from Tokio, Japan. Finally a couple collected by Mr. Chas. Wright at Owaska, Kamschatka, probably fr. Wilkes' Exp.

Exp. alar.

European spec., male, 72 to 88 mm., female 82 to 92 mm.
Asiatic spec., male, 72 to 96 mm.; female 78 to 96 mm.
Kamschatka spec., male, 72 mm.; female 84 mm.

The tail of the hind wings.

European spec., length 5½ to 9 mm.; breadth 1 to 1¼ mm.
Asiatic spec., length 5 to 10 mm.; breadth 1 to 1½ mm.
Kamschatka spec., length 5 mm.; breadth 1 mm.

The main average of the size of *P. machaon* is smaller than in *P. oregonius* and similar to *P. Zolicaon,* though there exist males of *P. oregonius* of the same size of *P. machaon.* The tail of *P. oregonius* is mostly broader, but not longer.

The description of the var. ASIATICA Ménétries quoted by Mr. W. H. Edwards stated "the submarginal border of the hind wings to be very broad, with the inner edge straight, and reaching nearly the end of the cell." In my Asiatic specimens this border is broad 4 to 7 mm., and in the European specimens 4 to 6 mm. The inner edge of the border of the Asiatic is mostly less concave than in the European ones, and *exceptionally* nearly straight; others show the same curve as the European ones. In specimens from Switzerland the inner edge of the border goes as near to the cell as commonly in the Asiatic ones; and other Asiatic specimens show the cell even more distant from the border as commonly as the European ones. The final note by Ménétries, "the marginal border of the Himalayan specimens is very much larger," belongs, apparently, to a comparison with those of Kamschatka, as the words before the N. B., "de l' Himalaya et Kamschatka," prove. Indeed the latter have the marginal border of the male 2½ mm. broad, of the female 4 mm. As the specimens from Himalaya and from Kamschatka mentioned by Mr. W. H. Edwards were communicated to him out of the collection of the museum, my remarks cover the same specimens.

The remark by Mr. Felder (Wien. Z. B. Ges., IV., p. 363, Mr. Edwards quotes the pamphlet edition, p. 75) "*var. asiatica* discrepans alis adhuc brevioribus posticisque in regione anali magis productis," is refuted by the measures given above. Mr. W. H.

Edwards quotes "the hind wings are shorter," which would be a contradiction.

I am not able to concur with Mr. W. H. Edwards that the name, *asiatica* Mén., does not apply to the prevailing type in Southern Asia; Mén. specimen was only a little more exaggerated. Mr. Kollar, in Huegel's Kaschmir, vol. IV, p. 406, saw some specimens from Himalaya, "different from *P. machaon* from Vienna, Austria, by darker yellow (this is true for the Koolloo specimens, but those from Jalloree-pass are bright yellow, just as the European ones), a little broader marginal bands, the black nervures in the yellow fields broader, more similar to the local varieties of Southern Europe and Dalmatia."

De Haan (Papil. nederl. overz. bezit. p. 42) says, "*P. machaon* is also found in Japan, without difference in colors; but the hairs on the end of the abdomen and on the inner border of the hind wings are longer and cover a part of the middle cell, which is not the case in the specimens from Netherlands." This is true for Himalaya specimens before me, but I have some European ones with equally long hairs. One male of *P. machaon* from Tokio, Japan, is before me. The hairs are as described by De Haan; the yellow color is as bright as in the European specimens; the blue spots in the band of the hind wings are larger and brighter. The submarginal series of yellow spots along the margin of the front wings is large and orbicular, the first and the last spot are ovoid. The European specimens have those spots as half moons, sometimes in crescent-shape. The external border of the spots offers a straight but interrupted line. The Himalayan specimens have these spots partly as in the European ones, partly orbicular as the Japan specimen, or more or less rounded, sometimes very small and largely distant. The Kamschatka specimens have the spots similar to the European ones. Meigen has figured a variety from Europe with all the spots connected, forming a band. There is to be found in the Tijdschr. v. Ent., 1852, vol I., p. 129, a remarkable paper by Mr. Ver Huell, with a colored plate of *P. machaon*, caterpillar, chrysalis and imago, which I find nowhere used or even quoted. The late brother of Mr. Ver Huell had raised (as he believed) an imago from a caterpillar before the last moult, being in the third stage. The editor believes this statement to be erroneous, "as nearly all caterpillars had changed after the last moult from black to green." The editor tried to repeat the observations of his brother by collecting a number of not full-grown caterpillars and providing them with a satisfactory quantity of food. Nevertheless some of them were black when transforming into chrysalis. As he supposed, they had maintained the black color after the fourth moult. From one-third of these chrysalis were raised two imagos, somewhat crippled but enough developed to show the identity with the specimen raised by his brother, which is figured. Besides the very small size (the figure shows a dwarf expanding 55 mm.) "the black bands and spots are larger; the orange spots on the under side of the hind wings are rarely seen in a well-developed imago." Ver Huell declared this imago to be *P. sphyrus Huebn.*

The collection of the museum has a similar dwarf from Switzerland (length of upper wing 30 mm., in Ver Huell's figure only 28 mm.); but Ver Huell's description does not mention two very important characters represented in the figure; the basal half of the cell on the under side of the primaries is black and their sub-marginal band suddenly diminished before reaching the costal-margin. The statement of the rare appearance of the orange spots in the imago is not true, after the specimens before me.

The same volume of the Tidschr has a paper by Mr. M. C. Verloren, "Observations sur le *P. machaon*," p. 90–108, which has been also entirely overlooked. The paper is the first, as far as I know, in which the influence of the cold temperature on the colors is acknowedged. Mr. Verloren observed many varieties in the coloration of the caterpillars; the black caterpillar is the most remarkable one. The black color replaces the green main color entirely; only some faint dorsal lines and some irregular green spots on the sides are left. The black variety belongs to the spring generation of the imago, at the beginning of the fall being rare, it becomes later dominant. The imago belonged to *P. sphyrus.* The paper contains besides many interesting observations not used by later Lepidopterologists.

I have never seen *P. sphyrus* (figured by Huebner, I, 155, p. 775–776.) from Europe. Huebner's figure represents, indeed, a *real machaon,* in size and colors exactly like the *var. asiatica* from the Himalaya.

Mr. Dutreux, Stett. E. Zeit., XV., p. 320, in his abridged translation of Ghiliani's paper on *P. hospiton* states, that *P. sphyrus* is on the whole similar to *P. hospiton;* the blue band above the orange spot is just as in *P. machaon* and not separated from the orange by a black border as in *P. hospiton.* I have only one specimen of *P. hospiton* before me, and I agree that it is a *very exaggerated* variety of *P. machaon.* Nevertheless, there exist more prominent differences, except the one quoted by Ghiliani between *P. hospiton* and *P. machaon.* The tails are excessively short, 2 mm.; the black band of the hind wings is much larger, covering nearly the outer half of the wing and reaching very nearly the cell. Nevertheless, the nervures in the basal yellow half are considerably less black than in the primaries and even less than commonly in *P. machaon;* the hairs of the abdomen and of the anal border of the hind wings are longer and more numerous; the under side of all wings differs even more, the basal part of the cell of the primaries is black; the marginal black band of all wings show between every two nervures a black elliptical curve, and the band of the under wings lacks on its internal margin the black bands; instead of them the small blue spots are internally surrounded by a very small black elliptical curve, at some distance from the inner margin of the band.

Zeller, in Isis, 1847, p. 216–219, speaks at some length on *P. sphyrus* and *P. hospiton*. *P. sphyrus* he puts with a ? as the spring form of *P. machaon* (Freyer, New Britr., I, p. 139, says; "*P. sphyrus*, Hueb., is simply a *P. machaon*,") pilosior abdominis dorso late nigro, alarum anteriorum venis dilatis, omnium fascia postica *latiore*. He concludes with acknowledging the very considerable variation of *P. machaon* in color, pilosity, size, shape and in the length of the tail.

Concerning *P. hospiton*, Zeller discusses in detail the figures and description of Herrich–Schaeffer, pl. 53, f. 249–250, p. 140. (They agree exactly with the specimen in the collection of the museum.) Zeller mentions specimens collected near Messina, Sicily, and concludes, finally, that the only difference of importance is represented in the black line separating the red spot in the angle of the hind wing from the blue lunule above the spot. But, he continues, the shape of the red spot (a crescent by Herrich–Schaeffer, and transversal ovoid in the museum's specimen) is variable in *P. machaon* and *entirely wanting* in the variety from Hamburg, figured in Freyer, New Britr., I pl., 74. This variety is even more remarkable as the figure of the under wing has on the under side a small red crescent divided from the blue spot by a large black band just as in *P. hospiton*; the basal half of the cell of the primaries is black, except a small paler spot near the base, just as in *P. sphyhus*. Zeller does not mention these two differences.*

The only description of the caterpillar of *P. hospiton* by Mr. Boisduval, Index p. 1–3, is short, "green with black, whitish and red punctated, with aborted spinules; living on *Ferula communis*. " Mr. Zeller objects against the spinules, but Mr. Verloren, l. c., p. 95, says: " Before the fourth moult the caterpillar possesses short spines, which disappear nearly entirely after the fourth moult. In the black variety these spines remain more apparent than in the green caterpillars." Besides that Mr. Boisduval has not stated that his caterpillar was full-grown, Verlorens remarks cover the case.

Dr. J. Delaharpe, Contribut. à la Faune d Sicile, Lausanne, 1860, p. 33, describes as intermediate form between *P. machaon* and *hospiton* a large female from Sicily. The primaries are as in P. *machaon*, the underwings and abdomen similar to *P. hospiton*.

Mr. Bellier de Chavignerie, Am. Soc. Ent Fr., 1860, p. 674

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* In *P. Zolicaon* the red spot in the angle of the hind wing is always separated from the blue lunule above it by a black line; but I find in some *P. oregonius* the indication of a black line, beginning from he outside to separate the red spot on the under side of the wings; even some of the var. *asiatica* show he same, but more faint.

says: All *P. machaon* from Sicily belong to *P. sphyrus*, but the spring form is darker and intermediate of *P. machaon* and *P. hospiton.*

I have given, as I believe, before ample and satisfactory proof concerning the variation in color of *P. machaon* and its most extreme forms, *P. hospiton*, *P. sphyrus* and *P. asiaticus.* It should be remarked that Dr. J. Delaharpe, l. c., p. 1–6, gives, 1860, very detailed and interesting examination of the causes which produce a change of color in butterflies and caterpillars. His paper has never been used in the literature concerning this question.

But not only the imago shows a large variation in color by *P. machaon.* The caterpillar and the chrysalis differ also considerably. Concerning the caterpillar, all stages, except the second, are well figured by Sepp. F. I., G. I., pl. 3.

The full-grown black variety, by Ernst T., I., pl. 34, f. 68, b.; by Freyer, l. c., pl. 74, the first stage and the full-grown black variety; by Ver Huell, l. c., pl. 7, f 1, the full-grown black variety. The full-grown green caterpillar is everywhere figured, sometimes together with the first form, Huebner Gesch. Schmett, pl. 47 and 49 with the chrysalis. Also De Geer gives good descriptions of the previous stages of the caterpillar. It is stated that the black variety gives imagos alike *P. sphyrus.**

There are commonly two forms of the chrysalis, one green, the other gray, which forms do not belong to the different sexes.

There are numerous communications in the Ann. Soc. Ent., Fr., about the two forms, after 1868. Mr. Fettig had contended that the color of the chrysalis changes conforming to the attachment on green or dark objects. Mr. Fallou, ibid Proc. 1871, p. 54, proves, by experiment, that this is not the case. The same author and Mr. Mabile, l. c., 1872, Proc. p. 55, state the same difference in the chrysalids of *P. hospiton.* A figure of the chrysalis of the black variety of the caterpillar is given by Mr. Ver Huell, l. c., pl. 7., f. 2.

Having tried to state the hitherto known limits in which *P. machaon* of the old world can vary, I arrive to the knotty question of the American *P. machaon.* Of the specimens quoted by Mr. W. H. Edwards ("PAPILIO," I, p. 75), I have only seen the type of *P. aliaska*, Scudder. I had the benefit to compare this type, together with the specimen of *P. Zolicaon* with which the author had compared it. A comparison with the Asiatic form was in 1869 entirely impossible for the author, as then no specimen existed in American collections, and only very few in Europe. The type of *P. aliaska* expand 80 mm.; and is identical with *P. oregonius.* The tails are very short, a little less than 5 mm. long. Among the differences noted by Mr. Edwards, the first one is remarkable, the hind margins of the fore wings are convex in all specimens seen by him. This is exactly the case in *P. aliaska*

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* Dr. Weisman Stadien, vol. II., pl. 2, f. 36, figures the sixth segment of the caterpillar of *P. hospiton* (apparently black var.), *P. machaon*, *P. Zolicaon.*

Among the large number of *P. oregonius* very few have this border straight, and only one a little convex. Among *P. Zolicaon* one from Mendocino and one from Washington Territory have the margin as convex as *P. aliaska*. Among the Asiatic specimens those from Kamschatka and two from Koolloo, Himalaya, have the margin convex, several others only a straight margin. Among the European specimens before me some have a straight margin, none a convex one. But the two varieties quoted before as figured by Ver Huell and Freyer have a convex margin. I think if even all Hudson's Bay and Aliaska specimens should possess a convex margin, this can only be considered to be a local variation. Messrs. Scudder and Edwards do not mention the shortness of the tail; after all, my measures show its extreme variability.

The second difference noted by Mr. Edwards, that the black parts are more intensely colored and less dusted by yellow scales, and the nervules very considerably edged with black, is not true for *P. aliaska*. The large material before me proves this statement for the Himalayan specimens, and even for some European ones to be incorrect.

I have given considerable attention to another difference; the black sub-marginal band of the primaries between the yellow part and the row of yellow spots near the margin. Mr. Scudder has used the same character for the band on the upper side of the wing. I speak here only about the same band on the ***under-side*** of the wing. It is very rarely entirely black, mostly more or less dusted with yellow scales in the middle of each cell. I find it entirely black in one *P. Zolicaon* from California, and three *P. oregonia* from Washington Territory. Mostly the yellow dust in the cells is connected to form a narrow or larger yellow middle line. Finally the band becomes yellowish-gray, bordered on both sides by a black line, the internal one broader. Near the anal margin the end of the band remains mostly black; near the costal margin the large marginal cell connected with the band is entirely black, or in part, or entirely yellow, with a broad black border on its basal end. The sub-marginal band is equally broad throughout or narrowed in approaching the costal margin. In the latter case two different ways are followed; or the inner margin of the band is straight to the tip and only gently sloping to the external margin, forming a more or less pointed band, or the two last cells have the internal black border removed more outwardly, so that those cells are similar to the steps of a stair. There exist intermediate forms where the internal margin of the second cell is oblique and connected at its base with the margin of the third cell so that this part of the band is sloping.

P. machaon from Europe has this band mostly straight, only the first cell narrower, broad 4 mm., first cell 2 mm., or broad 3 mm., first cell 2 mm. Some specimens from Austria, Alsace, and Switzerland belong to the intermediate form. The specimens from the Himalaya have the band as the European ones (sometimes larger, 6 to 4 mm., 4 to 3 mm.); a number belongs to the intermediate form (3 to 1½ mm.) and a few to the sloping forms (4 to 1¼ mm.). The Japan specimen has the European form, but the black borders of each cell are curvated instead of being straight. In *P. hospiton* the curvation is much more exaggerated. The couple from Kamschatka have very narrow sloping bands (3½ to 1 mm., 2½ to 1 mm.).

P. Zolicaon and *P. oregonius* have mostly sloping bands (4 to 1 mm., or even 6 to 1 mm.). But there are specimens of both species of the intermediate form and even of the European form; to the latter one belongs *P. aliaska* (4 to 2 mm.).

Therefore the band is generally straight in the European specimens; of the intermediate form in the Asiatic specimens, sloping in the American specimens. But everywhere specimens exist ranging exactly or nearly so with those of the other parts of the world. Besides the breadth of the band is equally variable in all those parts. Nevertheless the mostly sloping form of the band is about the principal character for the American specimens of *P. Zolicaon* and *P. oregonius.*

De Haan (in Verh. over de Naturl. Gesch. von Nederl. overz. Bez. Zool. Lepid. p. 42., pl. 5, f. 2) published and figured a a variety of *P. machaon* female of much larger size exp. 4½ inch (115 mm.); on the primaries the basal band less sharply cut and on the costal margin more nebulous, as is also the band along the margin of the under wings, which passes over the tip of the cell. Tails twice as long as usually; on the underside the four spots along the costal margin nearly yellow; on the under wings the middle band darker blackish, with sky-blue spots in the middle, internally cut in curves, externally ending in a yellowish color. Collected at Nangasaki, Japan, by Siebold.

Mr. Felder (in Wien. Z. B. Gesell., XIV, p. 314 and 362, No. 201) has made of this variety after two females from Japan his species *P. hippocrates.* This description, though somewhat difficult to understand, differs not from De Haan's, but he adds that the front wings are shorter, the hind wings longer, the blue moon above the red anal spot well separated from it.

The collection of the Cambridge museum possesses several males and females of this species from Kanagawa, Japan, collected by Mr. Gulick. After a comparison of those with a female from the Columbia River, Oregon, Mr. W. H. Edwards described *P. hippocrates var. oregonia* (in Trans. Amer. Ent. S., vol. V, p. 208). "It bears much the same relation to *P. hippocrates* as *P. aliaska* bears to *P. machaon.* With some exceptions it agrees well with females of *P. hippocrates.*" Mr. W. H. Edwards (in the Butterfl. of N. A., vol. II., part IX) describes the specimen as *P. oregonia* and gives the differences from *P. hippocrates.*

The three males from Kanagawa exp. 95 to 105 mm.; two females 105 to 112 mm.; the tail is 9 to 13 mm. long.

The females differ, indeed, more from *P. machaon* and *P. oregonius* than the other varieties. The yellow on the upper side is paler, more whitish, and of considerably less extent; the black ends more nebulous; the under side has more yellow, the black nearly disappearing; the blue moon above the red anal spot is separated by a strong black band. Of the three males one approaches in the color of the upper side more the females, but the two others are similar to *P. oregonius*, except that the yellow middle band of the primaries is narrower, the black band of the under wings larger, covering the end of the cell; the blue moon well separated by a black line. The tail of one male is not longer than in *P. oregonius*. The under side differs principally in the primaries where the black in the cell along the costal margin and along the nervures has disappeared. The black sub-marginal band is sloping, its internal margin waved (just as in the form from Tokio). The large black band at the apex of the cell is on the under side of all wings and in one female on the upper side, divided by a faint yellow line, which is more perspicuous on the Tokio specimen. The black band of the hind wings has the inner border straight or nearly so, reaching the end of the cell or not reaching it.

Mr. H. Pryer (in Trans. Ent. Soc., Lond., 1882, p. 486), on certain temperature forms of Japanese butterflies, says of *P. machaon*, "The difference between the temperature forms is very striking. March specimens are about 2½ to 2¾ inch in expanse and very pale colored, the summer forms expanding over five inches and are very dark, handsome insects. No alteration takes place in the markings, the colors being intensified only."

I think there can be no further doubt about *P. hippocrates* being only a marked and large variety of *P. machaon*. It is interesting to state that the colors and pattern of *P. hospiton* are about intermediate between the Tokio form and *P. hippocrates*.

Prof. A. Pagenstecher (in Verh. Heidelberg Nat. Medic. Ver., 1874, N. Serie. Heft I, p. 22, separ.), Ueber den ursprung einiger Europ. Schmetterlinge, speaks at some length about *P. hippocrates*. He has seen only the summer form, which he believes to be different from *P. machaon* and proposes for it the name *P. micado, because he has not seen intermediate specimens*," nor was he able to compare De Haan's work. He gives a full description. This paper has not been used by N. Amer. Lepidopterologists, though it treats at some length nearly all N. Amer. Papilios, and is very interesting, as he arrives to the final conclusion that the European forms are derived from the American ones. It treats at considerable length *P. asterias* and its related forms.

Can the separation of the American species be maintained? I answer boldly, *no!* After the examination of a hitherto unparalleled series of specimens, showing EVERYWHERE INTERMEDIATE FORMS, they should be considered as local or climatic varieties of one and the same species of *P. machaon*. I was very near supposing that *P. zolicaon* may be a spring form, as it is said for *P. sphyrus* in Europe. But though I consider the last statement as proved, for the American species double breeding has first to be proved. It seems more probable to consider *P. oregonius* as a climatic form, occurring in a region where nearly no rain falls through the summer, where the heat is excessive (we had only two weeks below 90° and more than a week above 100°), and which is, in fact, a sage-brush desert on basaltic soil. There is a gap still to be filled; the careful and exhaustive examination of the genital appendages of the male. The pattern is the same in *P. machaon* and *P. oregonius*, but there are differences in the finishing of the detail—as it is always in varieties or races. The parts are very complicated and satisfactory description should be given by specialists.

Mr. Pryer, l. c., p. 489, has now united eleven, perhaps twelve species of *Terias* as belonging to one and the same species, and remarks in conclusion, p. 491, that neither size, shape nor color can be relied on as guides for specific distinction and that temperature has a great evolutionary effect in the character of the insects. I believe that a revision of the N. Amer. Butterflies on this basis is a want. It is probable that *P. brevicauda*, *Bairdii*, *Indra*, *Pergamus* and probably *Americus* belong all to *P. asterias*.

The *Nymphalidæ*, *Satyridæ* and *Lycœnidæ* will certainly not stay behind in similar reductions.

PAPILIO RUTULUS.

We collected at Yakima City, W. T., on milkweed, July 1 and 2, 4 males and 4 females of *P. rutulus*, and before a dead chrysalis at Portland, Or., Exp. male 96–104 mm.; fem. 104–110 mm. Length of tails 10–14 mm. The form of the tails is very variable. They are simply sloping from 3 mm. at the base to a little more than 1 mm.; or 1½ mm. broad, a little larger on the rounded tip, or twice as large on tip; or broader 2½ mm., and decidedly spathulated on the 4 mm. broad tip.

I have before me in the collection of the museum 10 specimens, 6 from California, one of them with the locality San Francisco, and 4 collected by Mr. Garman on the way from Gr. Salt Lake, Utah, to Ft. Bridger, Wy., on an elevation to 7000 feet, in July and August, male and fem. Exp. 90 to 104 mm., tail 8 to 12 mm. long, or sloping, or of equal breadth, rounded on tip or spathulated.

Concerning the literature about *P. rutulus*, nothing exists but the original description by Boisduval and Lucas, both 1852, and the translation of the first by Rev. Morris. Mr. Felder (Wien. F. B. Ger., 1864, p. 361) says: By the shape of the wings easily to be distinguished from *P. turnus.* The female looks — primo intuitu — very similar to *P. daunus.* Mr. Mead (Wheeler's Exped., 1875, T. V., p. 741, says: Closely allied to *P. turnus;* the only constant distinction seems to be that the submarginal ray (of yellow spots) on the underside of the primaries (*secondaries Edw.*, is probably a misprint) is continuous; in *P. turnus* it is broken up in distinct spots, S. Utah; Colorado in June. Mr. Strecker (Lepid. 1877, p. 128) describes dwarfish specimens Exp. 70 mm. from Arizona as var. or ab. No figure of *P. rutulus* is known to me.

Mr. Boisduval says: *P. rutulus* differs from *P. turnus* in that the upperside of the secondaries have not the fulvous crescent on the internal angle, and the underside has not the fulvous crescent in the border, nor the sagittate spots between the border and discoidal cellule of *P. turnus* (Ann. Soc. Ent. Tr., 1852, p. 280, and Morris Lep. N. A., p. 4). Mr. Lucas says: *P. rutulus,* though very similar to *P. turuus* differs by very marked characters. The black margin of all wings is always darker and internally less sinuated; the five bands of the wings are deeper blackish, broader, principally the basal one, and internally less dentated. The series of marginal spots on the secondaries has only five crescents, sometimes only four, one of them fulvous; the yellow submarginal spots on the underside of the primaries form a continuous band; on the secondaries the fulvous marks in the centre of the submarginal spots are wanting.*

The characters admitted as proving the difference between *P. rutulus* and *P. turnus* are:

I. The submarginal ray of yellow spots on the underside of the primaries forming a continuous band (W. H. Edwards; Lucas).

II. The lack of the fulvous crescent on the upperside of the secondaries at the internal angle (Boisduval; Lucas).

III. The lack of the fulvous marks and the sagittate fulvous spots on the underside of the secondaries (Boisduval; Lucas).

IV. The margin of the wings and the five bands are broader and of a deeper black (Lucas).

It is very obvious that none of those differences are of decided importance. The examination of the constancy of those characters gives the following result:

Concerning I. and III., all 18 specimens before me agree in showing the characters mentioned here. Concerning II., 10 specimens ♂ ♀ have no spot at all on the internal angle of the secondaries; 8 spec. ♂ ♀ have a small yellow spot, or only a few yellow scales, or a spot more or less elongated to 3 mm. All specimens show on the same place on the underside of the wings a large yellow spot. Concerning IV. the marginal band of the upper wings is mostly 7 mm. of 2 spec. 9 mm. The second and third band near the costal margin are 5 to 7 mm. broad. The statement of Mr. Lucas that the bands and the margins are of deeper black, and the margins internally less sinuated in *P. rutulus* does not agree with the specimens of both species in my hands.

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* Dr. Behr. Stett. Ent. Z., 1866, p. 216, says: *P. eurymedon, rutulus* and one n. sp. can be perhaps nly local var. of *P. turnus* but ibid. 1868, p. 300, he says: *P. rutulus* is surely different from *P. urnus,*

There are before me 28 *turnus* males, females and ab. *P. glaucus* from the most different localities of the U. St. (Me., Mass., N. Y., Md., La.,. Miss., Ky., Tex.), and one yellow female from Owaska, Kamschatka. They were chosen out of a very large number to represent all varieties in the collection. The size is very different, the smallest one from S. E. Kentucky has the size and characters of pl. 5 of 1 W. H. Edw., representing the arctic form. A female ab. *glaucus* from the same locality measures only 82 mm. The largest male and fem. from Dallas, Tex., measure 125 mm., also pretty near 5 inches, more than Mr. Edward's maximum. The length and form of the tail is very variable from 10 to 15 mm., decidedly spathulated or not at all. A male from Osage, Miss., has a tail only 10 mm. long, but the spathula 4 mm. broad. Comparing the differences quoted for *P. rutulus* with *P. turnus*, we find as follows:

I. The sub-marginal ray of yellow spots on the under side of the primaries of *P. turnus* consists commonly of a series of separated spots of semi-circular or semi-oval shape, the convex side internally. Sometimes these spots are connected and form a band more or less waved internally, as the female from Kamschatka. A male from Lutherville, Md., and one from Kentucky have a straight, sloping band, only the two last spots near the hind margin separated. A male from Norway, Me., the same band, only the last spot separated, just in the same manner as some *P. rutulus*. The yellow female from Lutherville, Md., has the ray as commonly in *P. turnus*.

II. The fulvous spot at the internal angle is never wanting; the females possess a very large round spot; the males have a very small spot 2 to 1 mm. long, fulvous or red (yellow and more linear in *P. rutulus*). I have males from Texas of *P. turnus* with a very small yellow spot, only interiorly with a few fulvous scales; but a male from Osage has linear yellow spot 3 mm. long, just as some *P. rutulus*.

III. The fulvous marks and the sagittate spots are wanting in two males from Osage, Miss., and from Massachusetts. Indeed, there is a faint indication of fulvous scales in the cell above the eyespot of the anal angle, but I find similar indications by some *P. rutulus*. A female from Osage, Miss., has the fulvous marks and spots as commonly.

IV. The black bands and margins show no palpable difference. Considering these statements, there exist no character belonging exclusively to one of these two species, except that the females possess always a very large fulvous spot on the internal angle of the secondaries in *P. turnus*, but never observed in *P. rutulus*; besides that of the first species, black aberrations of the female occur frequently in the Southern and Middle States.

The caterpillar of *P. rutulus* is not yet known. The differences of the chrysalis from those of *P. eurymedon* are given by Mr. H. Edwards. Dr. Behr, l. c., 1868, p. 300, says the caterpillar of *P. rutulus* lives on fruit trees.

There is, I believe, no doubt that *P. rutulus* has to be considered as a Western form of *P. turnus* as long as no other differences are known to exist. I am more in doubt or better not able now to give a decided opinion about *P. Daunus*, as the material in the museum is not sufficient. It consists of seven specimens in very poor condition. The interior tail is broken. There were two large males collected on the same place with *P. rutulus* and flying promiscuously, July 3, at Yakima City and one smaller, very poor, at Spokane Falls, July 22. The large predominant yellow field with narrow and widely-separated black lines is, indeed, very striking. In the collection are three rubbed specimens collected together with *P. rutulus* by Mr. Garman, between Great Salt Lake and Ft. Bridger, at 7000′ about elevation. There were more than a dozen, but merely fragments, not worthy of being preserved. At the same time, July and August, and in the same place, Mr. Garman collected *P. eurymedon*. One *P. daunus* from Arizona is also before me. Of course, it is well-known that different species live together at the same place and time, but in examining nearer my specimens I am entirely at loss to find characters which can be considered to be good ones to separate *P. daunus* from *P. rutulus*. The internal tail of *P. rutulus* is never longer than in *P. turnus*; say 1 to 2 mm. About the tail of *P. daunus* I can say nothing, as it is wanting in all my specimens. All other differences consist in a larger or smaller development of the main color and the pattern without decisive influence. Entomologists with a larger and more satisfactory material at hand will have to give satisfactory characters to separate the two species. But I suppose this will be a difficult task, if not an impossible one. I do not know *P. pilumnus*.

I cannot speak with certainty about the relations of *P. eurymedon*, as I have only five specimens from the Gulf of Georgia in a somewhat tolerable condition before me. It may be only stated that two specimens collected by Mr. Garman, together with *P. rutulus* and *P. daunus* will be very difficult to separate from *P. eurymedon*, and have been, indeed, united with this species by experienced Lepidopterologists, who visited the museum. Both specimens are in very bad condition.

I possess the chrysalis of *P. turnus*, *rutulus*, *daunus*, but there is no possibility to ascertain differences of value after the comparison of one or two specimens.

A gap is also for those species that the appendages of the genitals are unknown. This gap can only be filled in a manner to allow scientific conclusions when the appendages of *P. turnus* are studied in many specimens, to begin with fresh or living ones. Only after the extreme limits of variation for one species are known, a scientific comparison with those of the other species will be possible and will give reliable results.

PARNASSIUS.

Mr. Stretch collected one female July 23, in Colville Valley, W. T., between Little Spokane and Loon Lake where granite first appears. A second specimen was seen. Exp. 65 mm. The whole body below, the front and the thorax above and the extreme base of the primaries were thickly covered with intensely yellow hairs. The veins of the wings on the under side were yellow, and also the membrane when the insect was fresh had a decidedly yellow tinge. Species known with yellow hairs are *P. Eversmanni* and its female (*P. thor*, as I am informed by Mr. H. Edwards) and *P. Nomion*, Fischer. A detailed comparison of the figures and descriptions of *P. Eversmanni* do not allow to bring the female to this species. *P. Nomion* is much larger, but, indeed, the marks and the pattern of the wings are very similar. I have no female var. *Smintheus* before me agreeing with the female from Washington Territory. The excellent figures of Mr. W. H. Edwards do not contain one exactly alike, pl. 2, f. 2, seems to be the nearest to it. Mr. W. H. Edwards speaks of partial covering of the body with dirty yellow hairs by *P. smintheus*, and as the pouch differs not notably from this species, it will be considered better as an exaggerated variety of *P. smintheus*.

Later, in W. Montana, August 7, I saw not far from the stagecoach, before New Chicago, some specimens flying, with the appearance of larger males of *P. smintheus*.

NOTES ON ORGYIA LEUCOSTIGMA.

By N. Coleman, Berlin, Conn.

A few notes on the various changes observed during the growth of the larvæ of *Orgyvia leucostigma*, Smith, may not be uninteresting to the readers of "Papilio."

My attention was first directed to these changes in the summer of 1877, by finding some larvæ differing in color from Harris' description of this species. Harris describes the larvæ as "of a bright yellow color, sparingly clothed with fine yellow hairs on the sides of the body, and having four short and thick brush-like yellowish tufts on the back, etc.," and with coral red retractile warts just back of these tufts. I need not give his full description, but only add that he said the caterpillars are found on rose bushes, apple and other trees and shrubs in July and August. Not knowing whether these belonged to a new species or to some variety, I watched for some eggs in order to experiment a little. I found some on an apple tree finally, and put them in a box, so that I could watch them from the time of their hatching. The eggs hatched out May 8, 1878. The larvæ were very dark-colored, head almost black, and showed some of the distinctive characteristics of this genus. They became lighter-colored after moulting. Nothing peculiar otherwise was noticed till June 14, when some of them moulted, and came out with *white* tufts on the back. Some of them pupated June 18, some June 19, but as they kept under the leaves during the latter part of their feeding, some might have retained the yellow tufts to the last, but some pupated while having the tufts white. My other duties prevented my watching them as closely as I desired, and I cannot say positively as to the number of times they moulted, but think it was five.

July 3 some moths made their appearance, both male and female, and as I wished for more fertile eggs to experiment further, I left them in the box. July 16 these eggs hatched, and the caterpillars obtained did not differ from those above referred to. Up to August 7 they had all lost the yellow tufts, except one, and that I put in a box by itself to see if sex had anything to do with the differences in color. One pupated August 14, and others the next day and the day following. August 15 the larva put by itself came out with white tufts, and pupated the 20th.

September 2 I found some of these caterpillars with yellow tufts on a rose bush and put them by themselves. By the next morning one of them had pupated and the others moulted during the day and gave me an opportunity to witness the operation. The caterpillar fastened its tail to the box cover, and in a short time the portion of the skin covering the head separated from the rest, and was soon detached by the head being curved under the body and rubbed on the box cover. The remainder split along the under side, and the caterpillar working its body back and forth, and from side to side, soon freed itself and came out with white tufts in place of the yellow ones it had previous to moulting. It seemed very much exhausted after the process. Some of the larvæ referred to August 7 changed back to yellow, and pupated in that condition, coming out September 5. The one that pupated August 20 produced a female. Of the brood now under consideration about one male to every five females was produced, but in the earlier brood the proportion of males was larger. Nothing had been proved thus far as to whether sex had anything to do with the color of the tufts or other changes in the color, though at one time I thought I should be able to prove that the larvæ which pupated with the tufts white would produce females.

I observed one change in some that pupated September 20 that I had not noticed before, Just before they underwent this change the stripes of yellow hairs along the sides became nearly white, but with a greenish tinge. September 10 and 13 I found *Orgyia* larvæ on pear, as also on apple trees, with white as well as yellow tufts, and one in which the yellow stripes had become greenish-white. The caterpillars found September 2 all produced females, There was a difference in size as well as in markings among the males obtained, some being larger than others; some with no light spot on the wings, and some much lighter-colored than others.

I found the larvæ still feeding on apple trees as late as October 8. A pupa found October 4 was full of eggs, showing that the eggs develop pretty soon after the caterpillar goes into the pupa state.

In November I put some eggs in a box to be ready for further experiment. May 19, 1879, these eggs hatched and the little caterpillars had blackish heads but with a tinge of red underneath. A cluster of eggs from which I expected to obtain *Orgyia antiqua* did not hatch. The larvæ of *O. leucostigma* were found feeding in orchards by May 20. Of those hatched in the box some had lost their yellow tufts by June 3, and I observed that those with white tufts had darker-colored bodies than the others. I again separated the white tufted ones from the others, but soon found both colors in the boxes, but the white ones had their heads as well as the warts on their backs orange-colored. June 6 I observed the most singular feature of all thus far noticed. One of the caterpillars had all the hairs on the back of a beautiful velvety black.

The *Orgyia* that hatched May 19 pupated June 17, and produced the imago June 29, showing quite a variation in the time these caterpillars remain in the pupa state. Some came out males, some females, showing that sex could not be determined by the color of the tufts.

June 22 the larva with the black tufts came out white, and the 23d it changed again to yellow. It pupated the 30th, and in due time produced a female.

September 6 I found several fawn-colored *Orgyia* on a hazel bush, but did not succeed in rearing them. The tufts on the back were darker-colored than the rest of the hairs. After all my observations, I have nearly come to the conclusion that *O. leucostigma* and *O. antiqua* are only forms of the same species. I know not positively, and shall make farther observations the coming summer. I have learned that it is not safe to draw hasty conclusions if I have learned nothing else.

PREPARATORY STAGES OF CATOCALA CARA, GUEN.

By G. H. French, Carbondale, Ill.

Egg.—Diameter .04 of an inch. In shape nearly globular, or a little flattened at the base; from this base to the middle the side is regularly curved. The top is a little depressed and contains a little button; from the middle to this depression the slope is straight instead of curved. Color olive brown, more greenish at first, with white striæ, below the middle these are equidistant, but above the middle they are in pairs, the base without striæ. Duration of this period 182 days.

Young Larva.—Length .15 inch, width .01 inch, width of head about .015 inch. Legs .12. Head and joint 1, rather pale reddish brown, shining; ocelli dark brown, joints 2 to 5 blackish brown, pale between the last two joints. Joint 6 is paler reddish brown than the head, the rest of the joints about the shade of the head except that the top of joint 7 is a little darker than the rest. The color on the joints from 6 to 12 is composed of four reddish-brown lines to each side, or eight in all, on a paler ground, the place of the dorsal line being pale. All the legs are whitish. There are small hairs over the body, apparently from the piliferous spots. Duration of this period 3 days.

After 1st Moult.—Length .20 inch. Ground color of body pale whitish-green, uniform throughout, the eight longitudinal stripes extending the whole length. Feet brown; tho first two pairs of prolegs showing as points about one-fourth the length of the others. Duration of this period 7 days.

After 2d Moult.—Length .33 inch. Color very dark brown or almost black, dorsal line whitish, one-fourth the width of the body in the middle, but narrower at the extremities, darker in the middle of joints 4 to 7. Subdorsal, suprastigmatal and substigmatal lines very narrow, feet a little paler than the body. Head concolorous, a white stripe each side of the middle of the face, clypeus and palpi pale carneous; the cheeks mottled with the same; jaws brown; the dorsum of joint 8 with a slight blackish elevation. Venter pale smoky-brown. There are about four more or less distinct wrinkles between the joints. Duration of this period 7 days.

After 3d Moult.—Length .90 inch. Head more distinctly heart-shaped than before. The whole body black with a series of crinkly whitish or yellowish-white lines, making the body striped with these two shades of color. On the dorsum the yellowish white predominates, below the subdorsal black is the prevailing color. The dorsal line is a series of long yellowish white ellipses with the central part black. Between this and the subdorsal line there are two distinct black lines and traces of a third between them in a series of black dots. The stigmata are in a black line; between this and the subdorsal there are three black and three yellowish-white lines. Substigmatal line yellowish-white, rather distinct, below that mottlings of this and black hardly separable into lines. Piliferous spots rather prominent, orange, ten on joints 1 to 3, twelve on the rest; the black elevation on joint 8 more prominent than before the moult. It is jet black and situated between the posterior pair of dorsal piliferous spots. The posterior pair of joint 11 more prominent than the others. A brown hair from each of the piliferous spots. The upper prominences of the head orange, the face black and carneous white, a black median line with one from near the top joined to this running to the palpi. Thoracic feet pale-brownish, the first and second pair of prolegs pale carneous gray, the others pale orange bordered with black. Venter dull whitish with the centre of each joint black. Towards the close of this period the dorsum became paler than at its commencement. Duration of this period 4 days.

After 4th Moult.—Length 1.45 inches. Marked similar to the last period, the ground color pale straw-color, finely spotted with black dots, the subdorsal being some of these run more or less together so as to give the appearance of a line. The orange piliferous spots a little more prominent; the ridge on joint 8 elevated .03 of an inch above the general surface, in color orange and black and a blending of these two. Head and top of joint 1 the same as ground color, mottled with blackish carneous, a darker streak blended with orange from the upper lobes to the ocelli. Feet carneous. Duration of this period 6 days.

After 5th Moult.—Length 2.10 inches. Ground color and black dots the same as in the last period; the piliferous spots a little darker orange on the back, the two posterior on joint 11 more prominent, with a little reddish tinge and a brownish-black mark extending from the back of each to over the spiracle. The protuberance on joint 8 a little more prominent, pale orange spotted on the sides with black, the orange extending down the sides of the body between joints 8 and 9. Head same as before the moult, the dark orange stripe on the face bordered behind with brownish black; ocelli 6, three black and the three outer yellowish. The anal segment tinged with carneous. A carneous fringe each side of the body, just above the legs. First and second pairs of prolegs two-thirds the size of the others and used as legs. Venter orange, joints 6 to 8 each with a large black spot in the centre; spiracles gray, edged with black. Hairs on the sides gray, those on the dorsum black or gray tipped with black.

Mature Larva.—Length 2.35 inches; width of head .20 inch; of joint 7, .35 inch; height of tubercle on joint 8, .06 inch. Marked as at the beginning of the period, but the black dots are more intense in some parts than in others, so as to give faint stripes, the dorsal and one below the subdorsal light, the one above the subdorsal and the stigmatal dark. These are so faint as not to be readily perceptible except in places. Other characters the same as at the beginning of the period. Duration of this period from 8 to 17 days.

Chrysalis.—Length 1.45 inches; depth through thorax .45 inch; through joint 1 of abdomen, .43 inch; joint 2, .44 inch, and from this gradually tapering to the tip. Wing cases extending over joint 5, the legs and antennæ reaching the same distance. Cephalo-thorax, wing and tongue cases coarsely shagreened, the abdomen finely punctured, the tip of the last joint very coarsely so. This ends in four hooks, two longer than the others, and two more hooks arising from the punctured portion at a little distance from the four. These hooks were fastened into a bunch of silk in the posterior end of the cocoon. Color dark brown, almost uniformly covered over with a white bloom. Duration of this period from 37 to 45 days.

The eggs from which the larvæ upon which the above observations were made were deposited October 6, 1881, from a female captured a few days before, 29 eggs being obtained. They were kept through the winter in a jelly dish and began hatching April 6, 1882, nearly all of them hatching that day. When first hatched they were very active and continued to be so during the first third of the larva period. They were first fed on the most convenient willow at hand, but this happened to be of a pubescent species which they refused to eat. This was not noticed till quite a number had died. A change to the young leaves of *Salix Nigra* proved more agreeable to their tastes and seven were carried through to the pupa state, six of these producing imagines. On opening the seventh cocoon some time afterward it showed that the moth had emerged from the chrysalis but had failed to get out of the cocoon. The cocoon is formed by fastening the leaves together with but very little lining, and that at the posterior end.

The larvæ hatched April 6th, and spun up May 11, 12, 18 and 20, respectively. The moths emerged June 23, 24 and 26, making the larva and pupa periods cover a little more than two months and a half. I have never taken this species in June, the usual time being from the first of August to the close of the season. There is scarcely time for the development of another brood from the last week in June to the first of August, and from this fact I am a little suspicious that the development of these was accelerated by confinement, though they were kept from any direct influence of the sun. Whether there is more than one brood in a season is a question for future observation. The parent moth was of the uniform brown type, but all the progeny were of the form *Carissima*, some males and some females.

SOME NOTES AND QUERIES ABOUT MOTHS. I.

By A. R. Grote.

Recently, in conversation with Mr. Henry Edwards, I spoke about some curiously neglected species of our moths, and my friend suggested that I should write out my remarks for "PAPILIO." This must be my excuse for the present gossipy paper, and I thought that its appearance now might be opportune in connection with the issue of the "New Check List," in the preparation of which I went over the literature concerning the species here mentioned. Some things which I find occasion to say may explain the synonymy of the "List" and supplement notes given in its pages; so upon this and other accounts it will be best to arrange my remarks under the heading of the different Families of moths.

I. SPHINGIDÆ.

Ninety-one species of this family are cited in the check list and one of doubtful value: *Cablei.* Of this number one, *Procne*, will have to go, being probably founded on an example of the East Indian *Lucasii.* Instead, it is probable that Dr. Clemens' *Lyncea* is not the male of *Ficus*, as he suggested, but a distinct form. As we have *Ficus* from Key West, it is probable that its companion *Syces* (= *Inornata*, of Clemens and *Ficus* of Ménétries) will also occur in our territory. I have not identified *Cupressi* of Boisduval. The figure leads me to suspect an *Ellema* and perhaps we have to do with a variety of *Coniferarum.* The odd series of abdominal marks are not like *Ellema.* To the genus *Hemaris* must be probably referred two species described by Dr. Boisduval as *Etolus* and *Pyramus*; the latter, as Mr. Hy. Edwards suggests is probably = *Uniformis*, which is = *Ruficaudis*, Kirby, according to Mr. Walker. Mr. Walker's determination I am willing to consider correct, although Kirby's description has certain points of difference when compared with our species. *Gracilis* is a totally different species and does not belong to the same group with *Uniformis.* Mr. Hulst claims to have bred *Uniformis* and *Thysbe* from the same larvæ. He further unites *Buffaloensis* as a small and *Floridensis* as a large form or variety of the same species. As to *Buffaloensis* he takes no note that Prof. Lintner describes the larva, and also that the cell of forewings gives an apparent distinctional character. *Buffaloensis* is always a smaller insect than *Uniformis*, whether bred or captured specimens are considered, and a dwarfed *Uniformis* would still be distinguishable from *Buffaloensis.* The species are all near, *Gracilis* being the most easily identified, and they must be the subject of careful study before pronouncing decided opinions on the different forms, which are of extreme interest. The species of *Hemaris* will always be of uncertain standing until the larvæ are well understood. There was a distinct necessity for naming and separating the different forms. Before we wrote upon them, all the different forms were called either "*Diffinis*" or "*Thysbe*," and though now there may be too many names, they must be carefully studied before being all thrown together again as varieties.

I close my notes on these *Sphingidæ*, by again explaining Dr. Boisduval's remark as to *Phaeton*, that we gave the name to the insect first in 1865, some two or three years before receiving specimens from himself, and that we were under the impression when we published this name that it was a MSS. one of his, which it now appears it was not, although the name given to an unpublished plate of the species when we described the insect in our Synonymical Catalogue. We again described the species and genus from Dr. Boisduval's specimen before the appearance of his name of *Erato*, which name, in his final work, Dr. Boisduval withdraws, and calls the insect *Phaeton*, which is its correct designation. The singular antennæ of this little Sphinx remind us of those organs in the still more aberrant form, *Arctonotus* of Boisduval,* and which I am the first to locate among the Macroglossians, I believe; in his last work Boisduval follows this example. The genus *Cautethia* replaces *Oenosanda* of Walker, there being already a genus *Oenosandra* when Walker published his name.

It contains three species, apparently, viz.: the type *Noctuiformis*, from St. Domingo, which I have examined, and which is certainly different looking from our South Florida insect, *Grotei* of Mr. Edwards. The Cuban species was identified by Dr. Herrich Schæffer as *Noctuiformis*, and he has figured it as such, but it is the same as our Florida form, very probably. The third species is Boisduval's *Spuria* from Mexico, larger but much like the other two. With regard to the queries as to our *Sphingidæ*, we have to find out the species described by Boisduval as *Pyramus*, *Etolus* and *Cupressi*, while the probability is that we have all three forms under other names. Mr. Butler's surmise that we did not know *Lugens* is incorrect, for at once I recognized its re-description as *Eremitoides* by Mr. Strecker. The student of the literature of the group will find that we were the first to recognize the character of the adhering scales on the vitreous fields of the wing in *Hemaris*, and that Mr. Strecker's accouut of the changing character of our views is fanciful. We were at first doubtful about the value of the character of the inner edge to the outer band on forewing, and hesitated to form species upon it. Now it is found that this character is reliable, but whether it characterizes dimorphic or true species is not clear. In the case of *Uniformis* we must admit, until Mr. Hulst's discoveries are contradicted, that it

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***Incorrectly attributed to me in the Brooklyn List.**

is a dimorphic form of *Thysbe* (*Pelasgus*). Among the species in the typical group of *Hemaris* not examined by me are *Senta*, Str. and *Metathetis*, Butl. As catalogued by me, I think the species are correct so far as our knowledge goes; I regret that I placed *Floridensis* as a variety of *Uniformis*, until more material is received. Our type is, I think, in Central Park collection. A specimen I received from Florida had the margin of the band like *Floridensis*, but the abdomen like *Fuscicaudis*. Was this a dimorphic form of *Fuscicaudis*, equivalent to *Uniformis ?*

When Clemens wrote, *Ampelophaga*, Boisd., was an unknown species; but I found that this was the equivalent of *Pandorus*, wrongly called *Satellitia* by Harris. Clemens has left us another query, viz: What is *Deilephila oxybaphi ?* described by him in the larval stage only. Kirby's species in Coleoptera, no less than Lepidoptera, do not seem easily recognizable from his descriptions. He has described a *Deilephila intermedia*, that most authors seem to think cannot well be our common *Chamœnerii*.

On pages 44 to 45 of our Synonymical Catalogue we give the names of the doubtful species. Some of the species, such as *Scyron* and *Japix*, had been merely wrongly credited to our fauna by older writers. The debatable names at present are:

Deilephila intermedia, Kirby.
" *oxybaphi*, Clemens.
Pachylia Lyncea, Clemens.
Paonias pavoninus, Geyer.
Macroglossa Etolus, J. Leconte.
Macroglossa Pyramus, Boisd.
Sphinx Cupressi, Boisd.

Dr. Clemens' species of *Chœrocampa*, described from specimens no longer in the Collection of the Academy at Philadelphia, are all extra limital. His *Macrosila Instita*, as published on page 14 of our Catalogue, is the same as *Ochus* of Klug, a species curiously neglected by Walker in the British Museum Lists.

With regard to the genera adopted in the "New Check List," they have been thoroughly tested so far as priority is concerned. I cannot find an objection to one of them and I think they stand upon a strong scientific basis and ought not to he disputed without grave cause. That in a few cases, as the genera allied to *Smerinthus* and *Chœrocampa*, certain of them are of subgeneric rather than generic value, may be still a matter of dispute. I think the student will find that this can only be properly questioned of two or three, and that, although there may be some prejudice against them, more will be lost than gained in lumping the species all together again. As they stand, they fall in with what has been observed by a student of the Sphinxes of the world, such as Mr. Butler, and, in great part, Dr. Boisduval. Where I differ from Mr. Butler, as in adopting *Dilophonota*, nearly identical in time of publication with *Anceryx*, I do so because Burmeister's genus is more limited in extent and is conceived in the sense in which I employ it. Hubner's genus *Phlegethontius* is equivalent to *Macrosila* as used by Dr. Clemens; the type of the latter seems different and the older name is used for properly associated species.

When we compare our fauna with that of Europe, we find that it is twice as numerous in species—91 to 40. Ours contains no true *Macroglossæ* of the type of *Stellatarum*, and no species of *Acherontia*, though loose writers such as Maasen have credited Mexico with a species of the latter genus.

In the European genus *Deilephila* we are poor, having but two, representative of two European species, *Livornica* and *Galii*, but apparently sufficiently distinct. In the clear-winged Macroglossæ, belonging to *Hemaris* (and its subgenus *Hæmorrhagia*) we have many forms against two in Europe. In the typical Sphinges, genus *Sphinx* (=*Lethia*), of which *Ligustri* is typical while *Convolvuli* is to be referred to *Phlegethontius*, we are rich in closely allied species against one in Europe. We have at least one true *Smerinthus* from California, congeneric with the European *Ocellata*. Our species from the East diverge from this type and resemble the species *Kindermanni* of Lederer from Asia Minor; again we have in *Versicolor* a representative of the genus *Ampelophaga*, also from Eastern Asia. In *Calasymbolus*, *Paonias* and *Cressonia* we have three American structural types of *Smerinthi*, while *Triptogon* has a great number of Eastern Asiatic species, hardly more than races, so near do they run together.

Our fauna comes mainly from the South, whence we receive the Chœrocampid forms. *Pachylia*, and perhaps *Argeus*, may breed in Florida and Southern Texas. The specimens taken occasionally on the coast and up the valley of the Mississippi are probably immigrants from the West Indies or Mexico. The *Manducæ* come to us largely from the South, and *Phlegethontius* is more numerously represented in South America. *Amphonyx Antæus* may be only an occasional visitant at Key West; the genus is West Indian and South American.

From Western and Northern Asia we receive *Hemaris*, *Deilephila*, *Smerinthus*, *Triptogon*, *Hyloicus* and *Sphinx*, though the development of the latter genus is North American. From the South we receive *Aellopos*, *Cautethia*, *Amphion*, *Enyo*, *Philampelus*, *Argeus*, *Pachylia*, *Daremma*, *Diludia*, *Amphonyx*, *Phlegethontius* and *Dilophonota*. With Eastern Asia we have *Eusmerinthus* and *Ampelophaga* in common. Genera peculiar to our fauna are *Lepisesia*, *Euproserpinus*, *Thyreus*, *Deidamia*, *Arctonotus*, *Everyx*, *Paonias*, *Calasymbolus*, *Cressonia*, *Ceratomia*, *Dolba*, *Ellema*, *Exedrium;* as a rule, genera containing single, comparatively striking and isolated forms. We may tabulate them as follows:

Genera of European and Asiatic Extraction.

	No. Species.
HEMARIS (typical)	10
DEILEPHILA	2
AMPELOPHAGA	1
SMERINTHUS (typical)	1
EUSMERINTHUS	2
TRIPTOGON	2
SPHINX	15
HYLOICUS	3
Total	36

This number loses its importance when we examine the species themselves. The forms of typical *Hemaris* are probably a little overstated. The development of *Sphinx* is *American*, rather than *European*. In Europe but one species, *Ligustri*, occurs. Our forms on my list, down to *Canadensis*, seven in number, are probably strictly typical; the remaining eight depart more or less, some approaching *Hyloicus*, however, a European type. Again, others are peculiarly American in appearance, but hardly give generic characters, such as *Gordius*, *Eremitus*, *Dollii*. On the whole, then, we have eight generic types coming from the Old World, the kinds of two of them, *Hemaris* and *Sphinx*, having multiplied and developed upon American ground. These types may be held as coming from the North, and as related to a former Circumpolar fauna.

Genera of Southern American Extraction.

NAMES OF GENERA.	*No. Species.*
AELLOPOS	2
CAUTETHIA	1
AMPHION	1
ENYO	2
PHILAMPELUS	4
ARGEUS	1
PACHYLIA	1
CHŒROCAMPA	1
DAREMMA	3
DILUDIA	3
AMPHONYX	1
PHLEGETHONTIUS	4
DILOPHONOTA	6
Total	30

We have thus thirteen generic types from the South, and although the species are less numerous than in the genera of Old World extraction, I have explained this circumstance away, and this present category of our Sphingid genera includes the most powerful element in our fauna.

Genera peculiar to North America.

NAMES OF GENERA.	*No. of Species*
LEPISESIA	1
HAEMORRHAGIA	4
EUPROSERPINUS	1
THYREUS	1
DEIDAMIA	1
ARCTONOTUS	1
POGOCOLON	4
EVERYX	2
PAONIAS	1
CALASYMBOLUS	2
CRESSONIA	1
CERATOMIA	1
DOLBA	1
ELLEMA	3
EXEDRIUM	1
	25

I think that the study in this way of the members of any one lepidopterous group will lead to interesting results. But such are only attainable when the material has been closely studied and arranged as I have tried to do with our *Sphingidæ.* Since my studies in the synonymy of the family, the results of which appeared in 1865, I have kept working on the genera and think these, as given in the "New Check List," have acquired a comparatively stable and final condition which will allow of conclusions as to geographical distribution being safely drawn. Especially interesting are such groups as *Hæmorrhagia*, which is an American development of an Old World type *Hemaris*, influenced apparently in the extension of the thorax by such South American types as *Aellopos.* But so long as writers call all or most of our *Caudiberbes* species of *Macroglossa*, it is evident that an erroneous idea is given at the outset to our fauna, which does not contain a single form really belonging to that Old World genus.

While the neuration is not greatly varied in the *Sphinges*, I find that it is most varied in the *Smerinthi.* Good characters are offered by which we may, for instance, distinguish *Cressonia*, in every way a strongly marked and peculiar form. That there is in this group considerable variation in antennal structure also is noticeable. We shall find that *all* the appendages vary in ultimate structure, accordingly as a group is plastic or subject to differences. The position of the wing in repose is also unusual in the *Smerinthi*, the hind wing being pushed upwards; several of the species look like curled and brown leaves. They are less obvious and more sluggish than the other *Sphinges.* Our most beautiful species is, I think, *Calasymbolus Astylus.*

Our greatest rarities from the East are *Flavofasciata, Cerisii,* *Luscitiosa* and *Jasminearum*. The first named is taken in Canada, Northern New York and Maine, the last will probably be found more abundantly southward. The larva of *Catalpæ* has turned out to be very numerous in various localities in the South, but the Moth has proved difficult to rear. With several other Sphingidæ, I took *Versicolor* twice at sugar near Buffalo, N. Y.; from its flight I could easily tell it from *Myron* and *Choerilus*, which came abundantly to bait, but it was harder to "bottle." It had a different way of taking the bait from the difference in tongue. *Hageni* has been taken in some quantity in Kansas by Professor Snow, and seems to occur throughout the Southwest as well as in Texas; I have not heard of its being found near the Atlantic seaboard. Our commonest species seems to be *Lineata*, after this, *Celeus*; *Abbotii* is also very well distributed. The species of *Hemaris* are more local; *Thysbe* is found over the widest territory. Mr. Hy. Edwards speaks of *bushels* of *Achemon* larvæ found in California on the vines; it is rarer in the East, but on Staten Island vineyards it was more usual than *Pandorus*. Of late years *Inscripta* has become rarer. *Labruscæ* has been found as far North as New Jersey, borne on the winds from more southerly latitudes.

In his "Synopsis of North American Sphingidæ," a work somewhat ambitious in appearance, but not evincing a corresponding study of the literature of the group, Dr. Clemens describes the following species, which are not generally known:

Calliomma Volatica from Brazil; *Deilephila oxybaphi* (larva) from Penn.; *Chærocampa Procne* said to be from California, but probably = *C. Lucasi* from East Indies; *C. Thalassina*, of which Butler says: "Seems to be allied to *Amadis*;" *C. Versuta* from Mexico. Butler seems to have overlooked *Calliomma Volatica*. Whether the type has gone the way of that of *Procne* I do not know, but it is certainly probable.

THE PREPARATORY STAGES OF ARCTIA NAIS, DRURY.

By G. H. French, Carbondale, Ill.

Egg.—Diameter, .03 inch, color, white; an obtuse cone, about as high as wide, flat at the base; smooth. These were found on a ripe strawberry in a single cluster, hatched 5 days after finding. They had the appearance of being freshly deposited so that it is probable this period is from 5 to 6 days.

Young Larva.—Length .06 inch, color dull pale gray, head black on the cheeks, a triangular space above the mouth of the same color as the body. On each joint there is a transverse row of tubercles, six distinguishable, black, from each arises a black hair as long as the thickness of the body. Feet 16. Duration of this period 6 days.

After 1st Moult.—Length .10 inch. Ground color similar to that of the preceding period; the tubercles dark brown instead of black, more than one hair from each. Head as before. Duration of this period 8 days.

After 2d Moult.—Length .20 inch. The only change aside from size is that the ground color is a little darker, and there are more hairs in the fascicles arising from the tubercles than before the moult. They are more active than they have been before. Duration of this period 6 days.

After 3d Moult.—Length .45 inch. Ground color leaden gray; dorsal, subdorsal and substigmatal stripes white. In the middle of each joint the subdorsal is orange, and there is also an orange spot just below this, above a tubercle. There are 10 tubercles to each joint distinctly visible now; the tuft of short hairs arising from each is black above but gray on the sides. Head black. Towards the close of this period the following changes were noticed: Ground color dull black, a little paler on the sides and venter; dorsal line yellowish white, subdorsal and substigmatal blackish; joint 1 somewhat lighter than the others. Head and thoracic feet jet black; prolegs pale, at the tip, orange spots on the sides dim. Duration of this period 7 days.

After the 4th Moult.—Length 1.00 inch. Color uniform black, the head shining, sides of the prolegs pale, and an indistinct pale dorsal line. As before, the fascicles of hairs from the dorsal tubercles black, those from the sides brown; those on joints 1 and 2 all brown. The interior part of the neck is reddish. Duration of this period 7 to 8 days.

After 5th Moult.—Length 1.70 inches. Color of body, tubercles and hairs as before, with the exception that the hairs on joint 2 are black, on the dorsum. Dorsal line nankeen yellow, faint on joints 1 to 3 and 11 to 12, but on all of the others distinct and expanded somewhat in the middle of each joint, those in the middle of the body expanding most; stigmata, orange. Head and thoracic legs brownish black; the prolegs brown, not very dark; venter slate color. No trace of any lines but the dorsal.

Mature Larva.—Length from 1.65 to 1.70 inches; width of head .15 inch; of middle joint .28; between joints .20; head brownish black, clypeus, palpi and antennæ whitish, the tips of the latter black; color of body and dorsal line as at the first of the period, as also the tubercles and hairs; 10 of the tubercles to each joint. All the other points as given before. Duration of this period from 3 to 11 days.

CHRYSALIS.—Length .75 inch, from anterior end to end of wing cases .43 inch, these not reaching quite to the posterior part of abdominal joint 5; antennæ and leg cases .35 inch from end.

Depth, thorax .25 inch; abdominal joint 2, .27; joint 3, .30; joint 4, 31; joint 5, 28; joint 6, 27; joint 7, 25. From the posterior part of joint 8 it tapers rapidly to the end. In shape nearly cylindrical, the bulge in joints 3 to 5 being mostly dorsal. The last joint terminates in 10 hooked, brown bristles in two clusters; the tubercle supporting these is striated longitudinally. Anterior portion rounded, the prothorax containing two slight elevations covered with short hairs. Color black. Head and thorax finely granulated, the first four abdominal joints punctured with a few larger depressions, mostly smooth and shining. Duration of this period from 11 to 12 days, one day devoted to spinning in addition to this.

As intimated before, the larvæ from which the above descriptions were taken were obtained from a cluster of eggs found on a ripe strawberry. There were 29 of the eggs, but only two larvæ were reared through all their changes. The eggs were found May 20, 1882; the first moth appeared July 13, the second, July 22, making a total period of from 54 to 63 days, or about two months. From captures for several years I had supposed the species to be two brooded, one in May from larvæ that hibernated and one in September, but a two month's period from egg to moth will give us three broods in a season, one in May, one in July and one in September. I have this year found them in July and the first of August, though I had not noticed them before.

The specimens reared from these two larvæ were first a ♂ of the form *Phalerata* figured in Harris, and second form *Nais* a ♀; though this can not be altogether a sexual variation, for my other specimens of this form are males. The male answers well to Harris's figure and description of *A Phalerata*, having "the hind wings next to the body, and sides of the body, reddish," the general color of the wing being reddish, but not so much so as next to the body. The costal margin of hind wing is black, with two small spots along the outer margin. My cabinet specimens vary from two to four of these spots. The second form or the ♀ has the hind wings more distinctly red, a black costal margin to which is joined a discal dash and large apical spot, and a long angular spot below the apex on the outer border. Further along in the outer border towards the anal angle are two large, nearly round, black spots joined together. This seems to answer to Dr. Morris' description of *Nais* with the exception of the color of the hind wings. All my males of this form agree nearly with this in marking, but the ground color of the wing is lighter. I have not Drury's plate or description by me, but may say that this corresponds with another ♀ *Nais* identified for me by Mr. A. R. Grote. Of course there is a bare possibility that the cluster of eggs on the strawberry was deposited by more than one moth, but there is not much probability, as they were in a single cluster. If we take it for granted that the two forms had a common parentage, then there is no longer any doubt of the identity of *Nais* and *Phalerata*.

With regard to *A Decorata*, I cannot as yet say as much. I have for some time regarded this as a form of *Nais*, but this season I have reared it from the larva, and found that it differs from the larva from which *Nais* was raised, as the following brief description of larva of *A Decorata* when full grown will show: It is black, rather thick, ten tubercles bearing clusters of hairs to each segment, the second and third on each side from above dark orange of rather a smoky hue, the tips black. Part of the hairs on the sides and all of those on joint 1, top as well as sides, are brown, the rest are black. Stigmata bright orange; no dorsal line. From this it may be seen that the identity of this with the others is a subject for future investigation.

TWO NEW SPECIES OF THANAOS.

BY W. H. EDWARDS.

THANAOS TATIUS.

Male.—Expands 1.6 inch.

Upper side of primaries umber-brown, blackish on disk and to base, the outer limb free from white scales; on outer edge of disk towards costa a light brown patch; on costa four sub-apical silvery dots, in zigzag line; one such dot in upper median interspace, and one, rather obscure, against end of cell; along hind margin a row of small patches of bluish-white scales; the usual (in this genus) extra-discal band is made up of large lanceolate and elongated black spots, separated, each edged on the outer sides by bluish-white scales, which scales form a conspicuous serrated line across the wing.

Secondaries black-brown with an indistinct series of lighter patches beyond the disk; fringes of primaries concolored; of secondaries white, cinereous at outer angle.

Under side of primaries lighter, the spots repeated, the one against cell distinct; along hind margin a row of white points, and at inner angle a white patch; beyond the disk an indistinct series of whitish patches, almost obsolete in the middle of the wing; the apical area dusted white. Secondaries uniform blackish-brown; along the edge of hind margin a macular white band, represented by dots on the upper half.

Body above dark brown, beneath same, but the thorax with many dark grey hairs; legs dark brown; palpi brown with dull white hairs interspersed; antennæ black, on the underside ringed white; club black above, the under side and tip ferruginous.

From a single male.

This fine species is readily distinguished from any of the white-fringed allies by the pure brown color of the marginal area of primaries, with no dusting of white, and by the conspicuous extra-discal band and its whitish servated edging.

THANAOS CLITUS.

Male.—Expands from 1.5 to 1.7 inch.

Upper side of primaries umber-brown, so much dusted with whitish scales and clothed with white hair as to discover the ground color only in small patches, as along the hind margin, and also a little within the margin and on basal area; the usual extra-discal spots are black, on the upper half the wing long, acute, below broad, lanceolate; on middle of disk a broad, black cross-band, reaching inner margin, and the basal area is mottled with black; a clear brown, but not well defined patch, at end of cell; on costal margin four sub-apical diaphanous dots, three in straight line, the fourth a little inside; a similar dot in upper median interspace, and one at the end of cell. Secondaries uniform black-brown; fringes of primaries black-brown, of secondaries white, cinereous at outer angle.

On under side the spots are repeated, a little enlarged; primaries have a marginal row of white points, sometimes meeting; also an extra-discal series of light-brown patches more or less dusted with white scales; in some examples, however, these also are wanting, unless next inner margin, and the whole limb is thinly dusted white, through which runs a submarginal series of brown patches; in all cases there are many white scales over apical area.

Secondaries immaculate, except for a few whitish points along posterior part of hind margin, which sometimes are developed into a white macular band.

Body above black-brown, thorax and abdomen beneath grey-brown; legs dark brown, with ferrginous hairs on under side; palpi dark brown, the tips of the hairs whitish; antennæ black, on under side slightly annulated white; club black above, ferruginous below and at tip.

From 6 ♂.

This species is allied to *Tristis*, Bd.

NOTES ON LEPIDOPTEROUS LARVÆ.

By A. S. Packard, Jr., M.D.

The following larvæ were collected during the past season in Maine, while engaged in collecting material for a revised and enlarged edition of Bulletin No. 7 of the U. S. Entomological Commission (Insects injurious to Shade and Forest Trees), which is to form the Fifth Report of the Commission to be prepared under the direction of the Commissions of Agriculture. The writer would here ask aid from lepidopterists in the way of specimens and notes concerning any insects found on any kind of forest or shade tree, in order to render the work as complete as possible.

Lycomorpha Pholus, Harris. Body cylindrical, long and slender, with five pairs of abdominal legs. The head is deeply bilobed, each side large and smooth, black mottled with horn-color. The body is provided with numerous tubercules from which arise long black dorsal or paler lateral hairs, which are a little longer than the diameter of the body; each segment is beset with 16-20 of these small hair-bearing mamillæ or warts. The general color of the body is horn-brown; the thoracic and abdominal legs of the same color. The tubercles at the end of the body are paler than elsewhere, making the end of the body appear above as if speckled with white. Length 15 ^{mm}

The pupa is short and rather thick, the end of the body very blunt, with no apical horns or tubercles. Length 10 ^{mm}

The caterpillar was found late in July, wandering about at Phipsburg, Me. Without doubt the food plant is lichens, as we have caught the moths in Maine, in former years, flying about lichen-covered rocks. The caterpillar we captured spun, July 31st, a thin silken cocoon with scattered black hairs on the outside. It changed to a pupa August 4th, and August 20th or 21st the moth appeared.

Acronycta occidentalis G. & R. The larva of this moth was observed wandering about at Providenee on September 21st. The body is cylindrical, hairy, with a black hump on the 8th segment, and a broad black longitudinal band. The general color of the body is a livid leaden hue. The larva began to spin a cocoon September 23, the moth appearing early in the following summer.

The pupa is 20 ^{mm} in length, of the usual form; the tip of the abdomen is obtuse, with eight long, even, stiff chitinous setæ which are incurved at the end. The basal abdominal suture is well marked, being very deep.

I am indebted to M. Grote for the identification of this and the species of Hypena.

Hypena baltimoralis Guen. The larva of this species was common on the red maple at Brunswick, Me., early in August. The body is very slender, and at first sight it must be regarded as a geometrid. The body is cylindrical, slender, tapering considerably toward the long anal legs, which are outstretched. The segments are moderately convex, the sutures being very distinct. The head is rather small, smooth, somewhat bilobed. All the legs, both thoracic and abdominal, are of the same color as the body, which is pale pea-green, of the color of the upper side of the leaf of the red maple, but slightly paler. The sutures between the segments are often straw-yellowish. The body sometimes has a slight purplish tint, the head remaining green. Length 22 ^{mm}

August 5th one began to spin a cocoon, the pupa appearing the 7th. It is dark chestnut brown in color. The moth issued August 17th.

Dichelia sulphureana Clemens.

Body tapering towards each end. The head is honey-yellow, considerably narrower than the body. The body is pale livid green with a corneous hue. There are no lines or any distinctive markings except the four usual warts or small tubercles which are arranged as usual in this family in a trapezoid. From these warts arise hairs one-half as long as the body is thick. At the end of the supra-anal plate is a flattened tubercule with spines. Length 15 m. m.

Common on *Pinus strobi* at Brunswick, Me., and also found on *P. rigida* the first week in August.

August 5th it began to make a slight cocoon by drawing together the leaves into a rude tube and spinning a slight cocoon between them. The pupa was found between the leaves August 7th. The moth appeared August 16–17th.

It agrees well with Robinson's Pl. V., fig. 37, though differing in some respects. According to Fernald's Catalogue of Tortricidæ, this common species feeds on the clover, Vitis, Ranunculus acris, and is an inquiline in willow galls.

Teras ferrugana, S.V. The larva was beaten from the white pine (*P. strobi*) at Providence, October 5th. The body is rather large, 20 ^{mm} in length, broad and flat. Head flattened, held out horizontally, reddish above, with a dark broad line around the edge. The body is green, with a reddish tint. The cervical shield is concolorous with the body and edged behind with dark black-brown, forming a curved line. Over the body above are scattered pale flecks.

The caterpillar pupated in the bottom of the breeding box, without making any cocoon. The pupa is slender, 8 ^{mm} in length, of the usual pale horn-brown color. Each abdominal segment is provided with two dorsal transverse rows of close set spines. The tip of the abdomen is suddenly truncated, compressed from above downwards, the edge is hollowed within, the edge itself curvilinear, with a small spine on each side.

The moth appeared October 20th or 21st. I am indebted to Prof. C. H. Fernald for kindly identifying it. According to his Catalogue of Tortricidæ of North America, this common European species feeds in Europe on the beech, birch and oak (Heinemann), and, according to Walsh, is in this country an inquiline in galls of *C. Salicis strobiloides*. It could not have been mixed with other Tortricids in my breeding tin box, as it was the only Tortricid in the little box, hence I think there is no doubt but that it at least occasionally feeds on the white pine. The larva is very characteristic and easily recognizable.

I have reared Tortrix (*Cacœcia*) *rosaceana* Harris, from *Betula* *populifolia*, the moth appearing in Maine, September 1. I have also raised *Thera contractata* Pack., from a pupa beaten out of the hackmatack, the moth appearing the first week in September.

SOME NEW NOCTUIDÆ AND NOTES.

By A. R. Grote, A. M.

Spragueia magnifica, Gr.

Base of fore wings very pale yellow, with a dark basal, mesial, longitudinal stripe sprinkled with chalybeous scales; internal margin also narrowly striped. Median space defined by outwardly oblique orange line, fusing with an outer orange line or band, exerted superiorly; the median space is thus narrowed inferiorly; ground color whitish or pale yellow; the small chalybeous discal spots are surrounded by the orange inferior shade of median space; a subterminal black band, edged with and surmounted by orange; terminal space pale yellow before the dark fringes. The smallest and most beautifully marked of the genus. Arizona, coll. B. Neumoegen, Esq.

This species differs from *Leo* by its smaller size, the narrower subterminal plumbeous band, widening a little inferiorly, which is not indented or broken; the even, curved edge to the pale basal field comes down to the margin at middle of wing; the costal black dots are absent; the submedian pale streak of the ground color at base is much wider, the inner margin here being only narrowly plumbeous. A most beautiful and vividly colored insect, very near *Leo*, but quite distinct on examination.

Spragueia Inorata, n. s.

A small, inconspicuous species, with the usual dark spots and bands absent. Ochrey orange, dull colored; reniform, an open ringlet, orbicular a minute dark point. Median space wide. Traces of the pale median lines, the t. a. nearly straight. Fringes slightly soiled inferiorly. The wing is darkest along internal margin and on terminal margin irregularly. Hind wings pale fuscous, subtransparent. Head and thorax like fore wings. The color is a pale buff-yellow, the darker shading somewhat dull ochrey orange. Texas. One specimen, coll. B. Neumoegen, Esq. This form approaches *Tarache*, slightly, in appearance.

Besides comparative details as to the ♂ genitalia and antennæ, the genus *Spragueia* differs from *Erotyla*, by the narrower primaries, which are also proportionately longer; the longer vein 9, and the different origin of 7 and 8, while the hind wings are only 7-veined, its European genus having them 8-veined. The ornamentation is different in pattern, and the American genus contains a number of little Tortricid-like species, the European having only one, comparatively broad-winged, more like *Erastria*. The genus comes to our fauna from the South, and our Cuban and West Indian species are congeneric; *Pardalis* from Florida is, I think, described also from the West Indies, but I have not been able to compare types. The difference in the neuration of hind wings alone is a generic character quite remarkable and constant, so far as I have examined the species.

EUSTROTIA DISTINCTA. n. s.

Size of *Apicosa*. Distinctly marked with black and white. Base of wing blackish to tremulous black t. a. line, behind which is a following uprighe white shade band. Ground color obscure grayish olivaceous . this obtains on median space outwardly, and encloses the small pale reniform. T. p. line much exserted and irregular. A black apical patch with a white shading between it and t, p. line. Another on internal margin before the angle, edging the t. p. line outwardly. Hind wings fuscous, with an ante marginal shade, like *Apicosa;* beneath paler, with double shades and dot. Fore wings pale along terminal margin beneath. Above, the black apical patch is partially cut by the pale s. t. line. One good specimen. Coll. B. Neumoegen, Esq.

PROTHYMIA PLANA. n. s.

Smaller than *Coccineifascia* and without the band. Fore wings dark yellow with contrasting pinkish-red fringes. No markings. Hind wings translucent stramineous. Beneath all pale yellowish, as is the body. On primaries beneath the fringe is discolorous. One specimen. Arizona. Coll. B. Neumoegen, Esq. So simply marked as to be easily known.

NEUMOEGENIA POETICA. Grote.

In describing this species I omitted to state that the costal region of primaries above was broadly white. It might be assumed from the rest of the description, as the ground color is given as "white," and the species is so simply marked and striking, no confusion could occur from want of detailed remarks.

EUSTROTIA PROPERA. Grote.

A second specimen shows traces of the blackish subterminal line, marked on costa, and the terminal space is centrally soiled with blackish. The fringe is dusky. This minute form can be confounded with no other ; it belongs to the *Apicosa* series.

Genus PLAGIOMIMICUS.

Front with a large, deep, empty cup, extending beyond the facial vestiture and thus completely exposed. In *Polenta*, the globose clypeus is surmounted by a shallow excavation with a slight central protuberance. In *Basilodes* there is merely a wrinkled prominence, the rim of which is hardly raised ; this holds for the second species, *B. Chrysopis* ; in which it is a little smaller. In *Stiria* the prominence is somewhat cordate, with better defined edge, and there is a button-like protuberance inferiorly where the base is indented. This holds for *Stiria Sulphurea*, Neum., except that the protuberance is pushed in a little without being central ; the excavation itself is a little more circular and smaller. In the two species of *Stibadium* the front is much as in *Basilodes;* in *Aureolum* Hy. Edw., an exquisite species, the excavation is a very little deeper and smaller than in *Spumosum*, in both partly concealed. In *Stiria* the patagia are prominently deflected. I find the labial palpi much longer in *Basilodes*, as compared with *Stibadium.* What Mr. Smith says as to the relationship of these genera is partly correct; I have overlooked the *resemblance* which *Basilodes* bears to them, but I should not unite them; each has some distinguishing points and *Stiria*, especially, somewhat strongly departs. *Basilodes*, *Stibadium*, *Stiria*, *Plagiomimicus* and *Polenta* belong to a group, oscillating between *Calpe* and *Heliothis*, which I have called *Stiriinæ* in the New Check List.

But, contrary to Mr. Morrison and Mr. Smith, I demonstrate the presence of a tibial claw in *Polenta Tepperi*, from an Arizonian specimen in coll. B. Neumoegen, Esq. The difference between *Polenta* and *Plagiomimicus* is thus confined to a modification of clypeal structure. It is not more distinct from *Basilodes* than the other genera. Mr. Smith accuses me of "resurrecting" *Trigonophora;* if he will look in Lederer, he will see that I took the genus from Lederer, and that I have followed this most distinguished authority in using Hubner's genus. In two very important statements I find Mr. Smith thus quite wrong. I shall allude to others. Mr. Morrison's statement that *Polenta* had unarmed tibiæ always seemed to me doubtful from the great resemblance between *Polenta Tepperi* and *Plagiomimicus Pityochromus* (*Media Morr.*) in shape and ornamentation. The genera are not sufficiently distinct. Consult Bull. B. S. N. S. Vol. 3, pp. 75–76, 1875.

PLAGIOMIMICUS EXPALLIDUS. n. s.

Wings pale olive ochrey with the s. t. line white-edged on costal region, margining outwardly the costal, dark triangular shade. T. p. line oblique, even, edged with white inferiorly. Median space somewhat yellowish and darker inferiorly. Stigmata lost in the pale shading of the discal cell, which shows a dark dot in the middle. Hind wings whitish. Smaller and differently colored, of a faded hue compared with the dark *Pityochromus.* Montana, Coll. B. Neumoegen, Esq. Expanse 26 mil.

Genus CAPIS, *Grote.*

A Deltoid genus with broader and squarer wings compared with *Sisyrhypena.* Antennæ (♂) simple, ciliate. Vestiture flattened, hairy, very silky. Eyes naked, tibiæ unarmed as usual in this group. Ocelli; eyes unlashed. Body slender, untufted. Abdomen not exceeding secondaries. Labial palpi loosely held, exceeding the front, third article short, second with longer and thicker scales. Tongue rather weak.

CAPIS CURVATA, *Grote.*

A rather small species, deep brown on primaries to the curved s. t. line running from apices downward somewhat obliquely to within internal angle; outside of this the wing is paler. Hind wings dark fuscous. Head and thorax dark brown. A male, received from Mrs. Fernald, taken at Orono, Maine. Previously I only had the female. The species is nearly concolorous, and may be known by the curved s. t. line.

AZENIA. n. gen.

Vestiture flattened hairy. Eyes naked. Form very slender, like *Spragueia*, wings narrow, long, primaries widening a little outwardly. Antennae simple. Legs unarmed, thinly scaled. Front with infra-clypeal plate prominent, but overshadowed by a parallel, long, distinctly tridentate, flattened, clypeal protuberance. Labial palpi closely scaled, a little longer than in *Xanthoptera.*

AZENIA IMPLORA. n. s.

Pale lemon yellow. Two ochrey dots in place of t. a. line. A median ochrey shade band, irregular and faint. One or two dots in place of t. p. line. Minute points at base of pale fringes. Hind wings white. Beneath whitish; costa of fore wings a little clouded. Head and thorax like fore wings. Abdomen pale, a little exceeding secondaries. Arizona. coll. B. Neumoegen, Esq. The armature of the head is disproportionately large.

XANTHOPTERA CLAUSULA. n. s.

Allied to *Semiflara*, but much smaller. Thorax and base of primaries bright lemon yellow. A fine white line, perfectly straight, divides the yellow base from the leaden outer field which is delicately frosted with white, and encloses a vague white cloud-like spot, the reniform. Fringes interrupted with pale yellowish above internal angle, outwardly. Hind wings translucent fuscous. Abdomen pale. Beneath pale, glistening, with reflected darker shades on fore wings. Arizona, Coll. B. Neumoegen Esq.

The labialpalpi are short; front globose. Eyes large and naked. Agrees with *Semiflava*, which I have left with the type of the genus *Nigrofimbria*, in *Xanthoptera.*

ESCARIA. n. gen.

Wings frail, wide, abdomen untufted, a little longer than hind wings, body slender. Labial papi short. Eyes naked, unlashed. Front with a moderately prominent, rather wide, cup-shaped protuberance, nearly hidden by the erect vestiture and with a central protuberance, not reaching over edges of cup, set in erect vestiture which fills the cup itself. Vestiture mixed, flattened hair and scales. Legs apparently unarmed. Seems to fall in between the *Tarache*-like genera and *Eustrotia.* Size of *E. Carneola.*

ESCARIA CLAUDA. n. s.

Grayish fuscous. In the ♂ the ornamentation is better written. Orbicular paler, spherical. Claviform moderate, its upper edge accentuated in black. Reniform moderate, lunate. Lines fine, perpendicular, edged with pale or whitish, especially in ♀, which is darker, and the white s. t. line quite prominent. Hind wings pale fuscous, trace of median spot and extra mesial line; a vague terminal band. Beneath grayish fuscous, with common line and faint discal spots. Four specimens, one with a reddish tint which seems a variety. Arizona. Expanse 20 mil.

Coll., B. Neumoegen, Esq.

PREPARATORY STAGES OF *SEIARCTIA CLIO.* PACK.

By Dr. Hermann Behr.

I do not know if the metamorphoses of this rare insect are known, and I therefore deem it an entomological duty to publish what a lucky chance has revealed to me on this subject. We are indebted for this interesting discovery to Mrs. Curran, wife of Dr. Curran, the well-known author of valuable works on Microscopic Botany. Five caterpillars were brought to me by Mrs. Curran, resembling most those of a species of *Halisidota*—in fact, they were so like those of the *Halisidota* of the oak (*H. Edwardsii*) that I at first thought them identical, but I afterwards observed that the hairs do not spring in a stellate form from tubercles as in *Arctians and Lithosians*, but that they grow in bushes like those of the larvæ of *Halisidota*, and of the European *Syntomis Phegea*, and the tufts were combed backwards as in *Ecpantheria scribonia.*

The food plant was *Apocynum androsæmifolium.* The larvæ were full grown when I received them, so I cannot judge if they would eat other plants of the *Apocynum* or *Asclepias* group. I tried *Vinca* and *Nerium* without success.

On the 20th of May the first began to spin and formed a web exactly like that of *Halisidota.* On the 12th of July I found in the breeding box a pair of *Seir. Clio*, the following day another, and on the 18th a single female.

The history of this transformation confirms my idea of the systematic position of *Seirarctia* and *Ecpantheria* being near *Halisidota* and *Syntomis*, to which genera also the neuration of the hind wings of the present insect bears a very close relation.

NOTES ON LEPIDOPTERA.

Larva of Amorbia humerosana. Clem. Body thickest near the middle, uniformly yellowish green, with a few scattered whitish hairs. Thoracic plate green, a curved lateral black dash on the first segment. Head pale brown, greenish in the centre, with a lateral black dash. Thoracic and abdominal legs and feet concolorous with the body, the anal feet black. Length when at rest twenty-two mil.; when crawling, 25 mil. Width in widest part, three mil. Food plants, the poison ivy (*Rhus toxicodendron* Mx.), and the spice bush (*Lindera Benzoin* Meis). Pupated September 16, in a folded leaf. Imago May 21. L. W. Goodell, Amherst.

NEW LOCALITIES FOR BUTTERFLIES. July 22d I saw a specimen of *Limenitis arthemis* Drury on the side of a mountain ravine, and on September 5th, one of *Papilio cresphontes*, Cram. in an open field. I did not succeed in capturing either, but had good views of both and have no doubt of their being these species. Both were fresh specimens, *cresphontes* especially, seeming to be just from the chrysalis. *L. Arthemis* must be exceedingly rare in this section, and I believe this is the first specimen of *cresphontes* reported in this state. L. W. GOODELL, Amherst, Mass.

STRETCH'S BOMBYCIDÆ OF NORTH AMERICA. Under date of June 20th DR. H. A. HAGEN, writes from Portland, Oregon, "In San Francisco I saw the plates for Stretch's new work on the Bombycidæ. They are really splendid, and the photoliphography admirably executed. I was so much interested in Stretch's work, and in the author himself, that I urged him to join our party, and was very glad when he decided to do so. I really believe that his work will be a great step to a better understanding of the Bombycidæ, the more so as Stretch has an excellent knowledge of the larvæ of many species. I think also that many spurious species will be eliminated and brought together."

CERATOCAMPA REGALIS AT SUGAR. I had a remarkable experience last evening. I was sugaring a small wood close to my garden with poor success, when, lo! upon the trunk of a small ash tree was a splendid *C. regalis*, sipping the sugar with all the enjoyment of a *Catocala*. I had no net and only a small cyanide bottle, so I gazed in astonishment and despair for a few seconds, when it leisurely fluttered away. It is known that this species is attracted by sweets?
DAVID BRUCE, Brockport, New York, August 4, 1882.

MOTHS AND BUTTERFLIES OF MONROE COUNTY, NEW YORK. Butterflies have been very late and scarce this season, *D. Archippus* not having as yet appeared (August 4th) and only a few *P. Rapæ* and *C. Philodice* having been seen. One very light *Pieris Protodice* was taken last week. This species was very common here in September of last year. I took forty larvæ of *M. Phæton* on June 1st. They fed on almost any low plant or shrub, many of them on *Typha Latifolia*, but they appeared to prefer *Lonicera*, and in confinement *Plantago*. I raised thirty-one examples. The remainder were stung by parasites, but kept on feeding two weeks longer than the healthy subjects. *Pap. Cresphontes* has occurred this season in abundance, though previous to 1880 it was almost unknown in this neighborhood. In that year a lady bred a fine ♀ from a larva found in the garden on *Dictamnus fraxinella*, and last year I discovered larvæ feeding on garden rue, *Ruta graveolens*. This year it has been seen in great numbers. I have taken seventy larvæ feeding on Prickly Ash, have reared all to the chrysalis, whence they are now emerging in beautiful condition. Yesterday I had the pleasure of seeing on the windows of my "Vivarium" living bred specimens of all the species of *Papilio* found in this district. viz.: *Ajax*, *Turnus*, *Troilus*, *Asterias* and *Cresphontes*. The last named species appears to be entirely free from parasites, not a single example that I have found being stung. DAVID BRUCE, Brockport, New York.

ANISOTA SENATORIA, Smith-Abbott. During the past summer this moth was very prevalent in Columbia County, New York. It made its appearance at Oak Hill, the residence of Mr. Hermon T. Livingston, in the township of Livingston in the latter part of June, and before the middle of August the larvæ had consumed the leaves of all the young oaks, the older trees not escaping severe spoliation. I observed that the oaks in the woods adjoining the place were not attacked, but that the trees skirting the forest suffered as badly as those upon the lawn, and were nearly stripped of their leaves. In the early season I destroyed myriads of the insects in the grasses under the oaks, just after pupation, and also some five thousand eggs soon after depositure; but notwithstanding these precautions against a damaging visitation, severe disfigurement, if not injury, to the oaks resulted from the insatiable larvæ. A very close observation of the habits of this moth has led me to determine that they can readily be exterminated from oaks situated in a lawn by trimming up the lower branches. The moths pair in the grass under the oaks very shortly after pupation, and as the wings of the female are small in proportion to the size of her body, she is unable to make a very extended flight. The eggs as discovered by me were attached to the underside of the leaves at the terminal twigs of all the branches nearest the ground, the branches at an elevation of twelve or fifteen feet not showing a single deposit.

FREDERICK CLARKSON, New York City, December 1st, 1882.

ALETIA ARGILLACEA HUBN.—This moth appeared at sugar October seventh and eighth at Karner (formerly Centre), N. Y. October seventh, four examples were taken, one of which was crippled and not able to fly and was crawling up a tree to taste the sugared bait. October eight, twelve examples were captured, one of which had just emerged from chrysalis and was not fully developed. It was leisurely climbing a sugared tree shaking out its wings in the act of development. It was allowed to remain until its wings were fully expanded and hardened, when it too fell a victim to the cyanide bottle. As I have not kept a record of all the moths captured at sugar previous to the month of October this year, I cannot say positively whether I have taken *Aletia* earlier in the season. I have, however, captured them at sugar every autumn since 1877. The weather after the seventh and eighth turned cold and stormy, consequently I did not again sugar until October 12th, but no more of this species have been captured since. The moth is taken with *Glaea*, *Lithophane* and *Scopelosoma* all of which are known to hybernate. May not the *Aletia* also pass the winter in this manner? This is an interesting subject for consideration. The specimens captured were all of them bright and fresh, and apparently had very recently come forth. I am convinced that the moth breeds in this latitude, and that its larvæ feed on some *Malvaceous* plant. I think that the facts set forth clearly prove that the present brood have not emigrated from a more southern latitude.—JAMES S. BAILEY, M.D. Albany, N. Y., Oct. 25, 1882.

FENNARIA SEVORSA. Gr.—This species must be known as *Phægarista Sevorsa*. I have just discovered that it belongs to this East Indian genus, the occurrence of which, in North America, is extraordinary. Having but one type, which I could not denude, I failed to study the neuration and mistook the position of the species, which is quite distinct from its old-world congener.

A. R. GROTE.

NOTICE TO SUBSCRIBERS. The present number concludes the second volume. The index and title page will be issued shortly. Intending subscribers to Volume III., 1883, are requested to forward their names to the editor as early as possible.

ERRATUM. On p. 139. Pamphila Python ♀ should be P. Python ♂.

Issued January 24, 1883.

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